

DIMENSIONS AND WEIGHTS OF ROAD DESIGN VEHICLES

(First Revision)



THE INDIAN ROADS CONGRESS

1983



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Published by
THE INDIAN ROADS CONGRESS
Jamnagar House, Shahjahan Road
New Delhi-110011
1983

Price Rs. 80/-
(plus packing and postage)

IRC: 3-1983

First Published : January, 1954
Reprinted : November, 1954
First Revision : August, 1983
Reprinted : October, 2005
Reprinted : June, 2009

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Printed at Abhinav Prints, Delhi
(500 copies)

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1. INTRODUCTION

1.1. The object of framing this Standard is to lay down a basis for designing road components. The dimensions and weights of vehicles are cardinal factors in the design of road elements. The width of the design vehicle has a bearing on the width of traffic lanes and that of shoulders. The height of the vehicle affects the clearance to be provided in designing road under-bridges, electrical service lines, and other overhead structures. The overall length of the vehicle (including trailer and semi-trailer combinations) has to be taken into consideration in designing horizontal curves and vertical curves, as also in framing safety regulations for passing and overtaking. The axle load affects the design of the thickness of pavement, whereas the total weight of the vehicle governs limiting gradients.

1.2. The Indian Roads Congress Standard on Dimensions and Weights of Road Design Vehicles was first published in January, 1954. When the question of metricization of this standard was taken up, it was felt that since by that time considerable changes had taken place in the design and construction of motor vehicles and concept of geometric and structural design of the highway system both in this country and abroad, there was need of its wholesale revision.

Accordingly, a revised draft for the Standard was prepared by L.R. Kadiyali. This was modified in the Ministry of Shipping and Transport (Roads Wing) considering the current amendments to the Indian Motor Vehicles Act 1939 and the latest trends on the subject both in this country and abroad. The modified document was considered by the Specifications and Standards Committee in their meeting held at New Delhi on the 24th May, 1983. The draft as approved with a few changes by the Specifications and Standards Committee was later approved by the Executive Committee and the Council in their meetings held on the 21st July and the 21st August 1983 respectively for being published as a standard of the Indian Roads Congress.

2. SCOPE

2.1. The Standard shall be applied in designing all road elements except culverts and bridges, the latter being governed by the IRC Bridge Codes.

2.2. For purposes of this Standard, three types of commercial vehicles have been recognised :

- (i) Single unit
- (ii) Semi-trailer
- (iii) Truck-trailer combination.

The selection of the vehicle type for design of a road would depend upon terrain conditions, economic justification, importance of the road and similar other considerations.

As a general guide, roads in steep and mountainous terrain need not be designed for truck-trailer combination and may only be designed for single unit vehicle and, where economically feasible, for semi-trailers.

Subject to the above, such of the maximum dimensions and weights out of those specified here shall be used that have the severest effect in the design of any road component. All road components, to be newly built or improved, shall be so designed that they are initially adequate or capable of being made adequate subsequently when the necessity arises, for the movement of vehicles conforming to this Standard and selected for design of the road.

3. DEFINITIONS

3.1. Axle

The common axis of rotation of one or more wheels, whether power driven or freely rotating, and whether in one or more segments, and regardless of the number of wheels carried thereon.

3.2. Axle Group

An assemblage of two or more consecutive axles considered together in determining their combined load effect on a pavement structure.

3.3. Gross Weight

The weight of a vehicle and/or vehicle combination without load plus the weight of any load thereon.

3.4. Length, Overall

The total longitudinal dimension of any vehicle or combination of vehicles, including any load or load-holding devices thereon.

3.5. Height, Overall

The total vertical dimension of any vehicle above the ground surface including any load and load holding device thereon.

3.6. Semi-Trailer

A vehicle designed for carrying persons or property and drawn by a truck-tractor on which part of its weight and load rests.

3.7. Single Axle

An assembly of two or more wheels whose centres are in one transverse vertical plane or may be included between two parallel transverse vertical planes one metre apart extending across the full width of the vehicles.

3.8. Tandem Axle

Any two or more consecutive axles whose centres are more than 1.2 m but not more than 2.5 m apart and are individually attached to and/or articulated from a common attachment to the vehicle including a connecting mechanism to equalise the load between axles.

3.9. Tandem Axle Weight

The total weight transmitted to the road by two or more consecutive axles whose centres may be included between parallel transverse vertical planes spaced not less than 1.2 m but not more than 2.5 m apart, extending the full width of the vehicle.

3.10. Trailer

A vehicle designed for carrying persons or goods and drawn by a motor vehicle which carries no part of the weight and load of the trailer on its own wheels.

3.11. Truck

A motor vehicle **designed, used, or maintained** primarily for the transportation of goods.

3.12. Truck-Tractor

A motor vehicle designed for drawing other vehicles, but not for a load other than part of the weight of the vehicle and load drawn.

3.13. Truck-Trailer Combination

A truck or a tractive unit with a trailer.

3.14. Width Overall

The total outside transverse dimension of a vehicle including any load or load holding devices thereon, but excluding approved safety devices and tyre bulge due to load.

4. NOTATIONS FOR VEHICLE TYPES

The Figure shows the outline of the vehicle types covered by this Standard. The first digit indicates the number of axles of the truck or truck-tractor. The letter "S" indicates a semi-trailer and the letter immediately following an "S" indicates the number of axles on the semi-trailer. Any digit other than the first in a combination, when not preceded by "S" indicates a trailer and the



TYPE - 2



TYPE - 3



TYPE 2 - S₁



TYPE 2 - S₂



TYPE 3 - S₁



TYPE 3 - S₂



TYPE 2-2



TYPE 3-2



TYPE 2-3



TYPE 3-3

Fig. Vehicle Types.

number of its axles. For instance, a 2-S2 combination is a two-axle truck-tractor with a tandem-axle semi-trailer. Combination 2-2 is a two-axle truck with a two-axle trailer.

5. DIMENSIONS OF ROAD DESIGN VEHICLES

5.1. Width

No vehicle shall have a width exceeding 2.5 m.

5.2. Height

No vehicle other than a double-decker bus shall have a height exceeding 3.8 m for normal application and 4.2 m when carrying ISO series 1 freight containers. Double decker buses may, however, have a height not exceeding 4.75 m.

5.3. Length

5.3.1. The maximum overall length of a single unit truck, exclusive of front and rear bumpers, having two or more axles, shall be 11 m.

5.3.2. The maximum overall length of a single unit bus, exclusive of front and rear bumpers, having two or more axles shall be 12 m.

5.3.3. The maximum overall length of a truck-tractor semi-trailer combination, exclusive of front and rear bumpers, shall be 16 m.

5.3.4. The maximum overall length of a truck-trailer combination, exclusive of front and rear bumpers, shall be 18 m.

5.3.5. No combination of vehicles shall comprise more than two vehicles.

6. MAXIMUM PERMISSIBLE WEIGHTS

6.1. Single Axle Weight

The total gross weight imposed on the highway by a single axle fitted with dual wheels shall not exceed 10.2 tonnes. In the case of axles with single wheels, the axle weight shall not exceed 6 tonnes.

6.2. Tandem Axle Weight

The total gross weight imposed on the highway by two axles in tandem articulated from a common attachment to the vehicle or

individually attached to the vehicles and spaced not less than 1.2 m but not more than 2.5 m apart, shall not exceed 18 tonnes.

6.3. Maximum Permissible Gross Weight

The maximum permissible gross weight for a given vehicle or vehicle combination would be equal to the sum of the individual single axle and tandem axle weights indicated above. For typical vehicles, maximum permissible gross weights are given in the Table.

TABLE : MAXIMUM PERMISSIBLE GROSS WEIGHTS AND MAXIMUM AXLE WEIGHTS OF TRANSPORT VEHICLES

Vehicle type	Maximum gross weight (tonnes)	Maximum axle weight (tonnes)			
		Truck/Tractor		Trailer	
		FAW	RAW	FAW	RAW
Type 2 (Both axles single tyre)	12	6	6		
Type 2 (FA-Single tyre RA-Dual tyre)	16.2	6	10.2		
Type 3	24	6	18 (TA)		
Type 2-S1	26.4	6	10.2		10.2
Type 2-S2	34.2	6	10.2		18 (TA)
Type 3-S1	34.2	6	18 (TA)		10.2
Type 3-S2	42	6	18 (TA)		18 (TA)
Type 2-2	36.6	6	10.2	10.2	10.2
Type 3-2	44.4	6	18 (TA)	10.2	10.2
Type 2-3	44.4	6	10.2	10.2	18 (TA)
Type 3-3	52.2	6	18 (TA)	10.2	18 (TA)

FA — Front Axle

RA — Rear Axle

FAW — Weight on Front Axle

RAW — Weight on Rear Axle

TA — Tandem axle fitted with 8 tyres.

